SECTION 13 21 60
FUEL STORAGE AND DISPENSING SYSTEM (ABOVE GROUND)

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers aboveground storage tanks, fuel monitoring system, leak detection and alarm system, fuel pumps and dispensers, fuel island, accessories and piping associated with the storage and dispensing of diesel and unleaded gasoline fuel.

B. The Contractor shall furnish and install the petroleum fuel storage system(s) for the service(s) shown on the Drawings and as specified, including all accessories, structure and appurtenant items required for a complete installation. System shall conform to current local, state, and federal environmental protection standards and codes for aboveground fuel storage tanks, fuel pumps, dispensers, and piping.

1.2 RELATED DOCUMENTS

1. The General Conditions and General Requirements of Division 1 apply to this Section.
2. Section 02 41 00, DEMOLITION.
3. Concrete: Section 03 30 00, CAST-IN-PLACE CONCRETE.
4. Miscellaneous Steel: Section 05 50 00 METAL FABRICATIONS
5. Sealants and Caulking: Section 07 92 00, JOINT SEALANTS.
6. Painting: Section 09 91 00 PAINTING.
7. Electrical Requirements: Division 26, ELECTRICAL.

1.3 QUALITY ASSURANCE

A. All equipment furnished and all work performed shall be in strict accordance with current applicable standards as set forth by the National Fire Protection Association (NFPA), Underwriters Laboratories (UL), the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), and other national or local standards where applicable.

B. Test and inspect fuel storage tanks, after fabrication and before shipment, according to ASME and the following:

1. Pressure test: UL 142
2. Vacuum Test: To verify structural integrity, every tank shall be vacuum tested by the manufacturer at the factory.

C. Affix standards organization's code stamp.

D. Installation: All tanks and piping shall be properly installed by an aboveground fuel storage tank supervisor who is certified in tank system installation in accordance with a code of practice developed by a nationally recognized association or independent testing laboratory and in accordance with the manufacturer’s instructions. *Note: Tank and piping system installation practices and procedures described in the following codes may be used to comply with the requirements of this section:*

1. Tank must be listed and labeled in accordance with UL Standard 2085. A sample copy of the tank's label and certification must be included with the bid.
2. Steel Tank Institute installation instructions R-942 and per manufacturer's instructions.

E. Certification of Installation: Ensure compliance with by submitting a properly completed notification form to the delegated agency, or, if no delegated agency exists, to the Resident Engineer. The form must be signed by a certified supervisor.

F. The latest or locally adopted revision of the following standards shall apply to work hereunder.

1. Kansas Department of Health and Environment:
   KAR 28-44 Petroleum Products Storage Tanks.
   Kansas Storage Tank Act (65-34).
2. International Fire Code.
3. American National Standards Institute (ANSI):
   B16.3 ..... Malleable Iron Threaded Fittings.
   B16.11 ..... Forged Steel Fittings, Socket Welding and Threaded.
   B1.20.1 ..... Pipe Threads, General Purpose.
   B31.3 ..... Chemical Plant and Petroleum Refinery Piping.
4. American Society for Testing and Materials (ASTM)
   A 53/A 53M ..... Pipe, Steel, Black and Hot-dipped, Zinc-coated Welded and Seamless.
   A 234/A 234M ..... Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
   D 1599 ..... Standard Test Method for Resistance to Short-Time Hydraulic Pressure of Plastic Pipe, Tubing, and Fittings.
   D 2310 ..... Standard Classification for Machine Made Glass Fiber Reinforced Thermosetting Resin Pipe
   D 2774 ..... Underground Installation of Thermoplastic Pressure Piping.
   D 2996 ..... Filament-Wound Glass Fiber Reinforced Thermosetting Resin Pipe.
   D 3139 ..... Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
   D 3222 ..... Unmodified Poly(Vinylidene Fluoride) (PVFD) Molding Extrusion and Coating Materials
   D 3261 ..... Butt Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
   D 3350 ..... Polyethylene Plastics Pipe and Fittings Materials.
   D 4976 ..... Polyethylene Plastics Molding and Extrusion Materials.
   F 405 ..... Corrugated Polyethylene (PE) Pipe and Fittings.
   F 477 ..... Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

5. National Fire Protection Association (NFPA).
   30 .....Flammable and Combustible Liquids Code.
   30A.....Code for Motor Fuel Dispensing Facilities and Repair Garages.
   70 .....National Electrical Code.
   325M .....Fire Hazard Properties of Flammable Liquids, Cases, and Volatile Solids.
   704 .....Identification of the Fire Hazards of Materials.
6. National Electrical Manufacturers Association (NEMA).
   250 .....Enclosures for Electrical Equipment (1000 Volts Maximum).
7. Underwriters Laboratories Inc. (UL).
   142 .....Steel Above-ground Tanks for Flammable and Combustible Liquids.
   567 .....Pipe Connectors for Flammable and Combustible Gas.
   842 .....Standard for Safety Valves for Flammable Fluids.
   971 .....Nonmetallic Underground Piping For Flammable Liquids.
   2085 .....Protected Above-ground Tanks for Flammable and Combustible Liquids.
8. Petroleum Equipment Institute Recommended Practices:
   PEI/RP200-96

G. Installer Qualifications: Fuel system installation contractor shall have current licensing as required by the State of Kansas and local regulatory agencies for fuel storage, piping dispensing systems installation.

H. Fire Marshal Approval: Contractor is required to obtain approval from the local Fire Marshall before beginning installation.

I. Delegated Design: Design restraint and anchors for fuel piping, ASTs, and equipment, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

J. Seismic Performance: Factory-installed support attachments for ASTs shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
   1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submit catalog product data for each item, material, or procedure to be utilized and installation and operation manuals. Include construction details, material descriptions, and dimensions of

individual components and profiles. Also include, where applicable, rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1. Piping Specialties
2. Valves: Include pressure rating, capacity, settings, and electrical connection data of selected models.
3. Each type and size of fuel storage tank. Indicate dimensions, weights, loads, components, and location and size of each field connection.
4. Fuel storage tank hardware and accessories.
5. Fuel storage tank piping specialties.
6. Submersible fuel pumps.
7. Fuel Dispensers.
8. Card Reader System and Reporting Software.
9. Tank Monitor and Leak Detection System.
10. Double Wall Piping System (pipe, fittings, and tools).

C. Submit product and procedures required for anchoring and supporting equipment and piping to meet applicable seismic requirements for Leavenworth, Kansas.

D. Manufacturer’s installation instructions for the specific models submitted.

E. Applicable UL certification.

F. Calibration chart.

G. Installation drawings: Scale drawings of tank and fuel system showing all dimensions. Drawings shall include all critical dimensions and show routing and location of piping, locations of all fittings and accessories, i.e., ladders, supports, anchors, lifting lugs, lightning protection, fuel pumps, vents, monitoring and gauge openings, etc. Include detailed drawings of all accessories and their installation relative to the tank and fuel island and dispensers.

H. The Contractor shall have a copy of the manufacturer's instructions available at the construction site at all times and shall follow these instructions unless otherwise directed by the Resident Engineer.

I. Training Data: The manufacturer shall assist the Contractor by training and instructing the Contractor's personnel in proper installation procedures and techniques. Certification will be required in writing from the manufacturer listing the names of those persons so qualified. The manufacturer's representative shall be a person regularly engaged in such service and shall be certified in writing by the manufacturer to be technically qualified and experienced to supervise this training.

J. Certificates of Compliance: Upon completion of the project and before final acceptance, the Contractor shall deliver to the Resident Engineer a statement signed by the principal officer of the contracting firm stating that the installation is satisfactory and in complete accordance with the contract plans and specifications and the manufacturer's prescribed procedures and techniques.

K. The Contractor shall provide copies of all documentation required by the applicable State and the local authorities having jurisdiction, including Contractor's certification of proper installation.

L. Licenses and Permits: Contractor shall obtain and pay for all required city, state, and federal licenses and permits. Contractor shall arrange and pay for all required inspections and certifications.

M. Warranties: The Contractor shall provide copies of all warranties and required start-up documentation.

N. Records: The Contractor will maintain a chronological record throughout the course of the contract of all deficiency items.

O. Test Reports: Upon completion and testing of the installed system, test reports shall be submitted showing all field tests performed to adjust each component and all field tests performed to prove compliance with the specified performance criteria.

P. Record Drawings: Record Drawings ("As-Builts") shall be prepared and submitted by the Contractor, as described in Part 1.7 of this Section.

1.5 STORAGE AND HANDLING

A. Above-ground Tanks shall be handled in strict accordance with manufacturer's written instructions.

B. Pipes, valves, manholes, fittings, and appurtenances shall be handled so as to insure delivery to the location in sound, undamaged condition. Particular care shall be taken not to injure the coating or lining. If the coating or lining of any pipe or fitting is damaged, the repair shall be made by the Contractor at his expense in a satisfactory manner.

C. No other pipe or material of any kind shall be placed inside a pipe or fitting after the coating has been applied. Pipe shall be carried into position and not dragged. Use of pinch bars and tongs for aligning or turning pipe will be permitted only on the bare ends of the pipe. The interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method.

D. Before installation, the pipe shall be inspected for defects. Material found to be defective before or after installation shall be replaced with sound material.

E. Rubber gaskets that are not to be installed immediately shall be stored in a cool and dark place.

F. Fiberglass-reinforced epoxy pipe (FRP) and fittings shall be handled and stored in accordance with the manufacturer's recommendations.

G. Store pipes, fittings and valves or pipe and fittings to protect from direct sunlight and physical damage.

1.6 CONTRACT DRAWINGS

A. Drawings are diagrammatic and indicate the general arrangement of tanks, the fuel island, and work included in the contract. Drawings shall be examined for appropriate location and routing

of the piping between the tanks and the fuel island. Submit all proposed deviations from contract documents and submittals prior to proceeding with work.

1.7 RECORD DRAWINGS

A. Furnish record documents in accordance with Article “AS-BUILT DRAWINGS” of the General Requirements.

B. Maintain accurate field records of all locations of concealed piping, conduit, and service connections which are installed, indicating dimensioned locations from buildings, and other readily distinguishable site features.

C. Prepare record (“as-built”) drawings showing locations of all piping, conduit, and service line connections which were installed.

1.8 OPERATION AND MAINTENANCE MANUALS

A. Prepare O&M manuals in accordance with requirements of Division 1 of these specifications. The manual shall detail the step-by step procedures required for system startup, operation, emergency shut off, and shutdown. The manual shall include the following information for equipment items:

1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
2. Manufacturer’s printed operating procedures to include start-up, break-in, and routine and normal operating instructions, emergency shut off, and summer and winter operating instructions.

1.9 WARRANTY

A. General Warranty: Special warranty specified in this Section shall not deprive Government of other rights Government may have under other provisions of Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of Contract Documents.

B. A 2-year product warranty covering all materials and workmanship, except for the fuel storage tank and flexible double containment piping, shall be provided by the Manufacturer. The 2-year period shall begin at the date of final acceptance.

C. The fuel storage tank shall carry a 30-year warranty from the date of final acceptance against tank internal and external corrosion, leakage, and defects in material and workmanship. Warranty shall cover materials or manufacturing defects, leakage, and structural failures (including cracking, breakup, or collapse).

D. Double-Containment Piping and Related Equipment shall carry a 30-year warranty from the date of final acceptance against failures due to defective materials or workmanship for materials installed together, including piping, sumps, entry boots, and sump mounting adaptors.

PART 2 - PRODUCTS

2.1 FUEL STORAGE TANK

A. Above-ground Atmospheric Protected Petroleum Storage Tank:

1. Manufacturers: Subject to compliance with requirements herein, provide products by one of the following:
    a. Containment Solutions, Inc.
    b. We-Mac Manufacturing Co.
    c. Modern Welding Co., Inc.
2. The primary and secondary containment tank shall be steel construction and pressure testable.

B. Tank shall meet the following design criteria:

1. Aboveground fuel storage tanks shall be constructed as a UL-2085 listed Protected Aboveground Tanks for Flammable and Combustible Liquids.
2. The tank shall have certification for CARB for Phase I and II Vapor Recovery.
3. The anchoring tie-downs shall be welded to the bottom of the secondary tank and meet applicable seismic requirements for Leavenworth, Kansas.
4. All openings shall be from the top, with threaded NPT risers.
5. The standard primary storage tank shall be cylindrical in design. The primary storage tank shall be constructed and listed in accordance with UL-142 standards.
6. The primary tanks shall be fitted with a 4” fill port; an emergency vent port, size per local code; a normal vent port sized per NFPA 30; a 2-inch liquid gauging port; a 4-inch electronic gauging port; 4-inch ports for fuel line connections; a 4-inch phase I vapor recovery port; and a 4-inch submersible pump port.
7. The primary tank shall be pressure tested to UL 142 standard (minimum 3 to 5 psi) at the factory.
8. The tank design shall provide a minimum 2-hour fire rating per UL 2085.
9. The fire protective material shall provide a minimum of an R10 insulating factor.
10. The factory representative must be able to certify that the primary and secondary containment does not leak and that the fire protective material retains its minimum 2-hour protection.
11. The secondary tank shall be tested liquid tight at the factory (minimum 3 to 5 psi).
12. The secondary tank shall provide through 360 deg radius “pressure testable” containment for the primary tank.
13. The secondary tank shall be fitted with a normal vent port, size per NFPA 3O, or an emergency vent port, size per local code, in addition to openings for all ports in the primary tank.

14. The port openings in the top of the secondary tank shall be constructed with full welds to prevent moisture from seeping between the fireproofing material and secondary and primary tanks.
15. The secondary tank shall have a 2-inch monitoring port including a tube that provides a means to detect product leakage from the primary tank into the fire protection material that directly surrounds the primary tank. This design shall be listed under UL 2085.

C. Tank Dimensions:
1. Tank shall have nominal capacity of 2,000 gallons.
2. Tank shall have nominal outside dimensions of 13 feet by 70 inches in diameter.

D. Tank Coatings: The exterior surface of the secondary tank shall be cleansed of foreign material, primed, and coated with corrosion-resistant industrial epoxy point (3 to 5 mils dry thickness). Color shall be white or red with final color section during shop drawing submittal process.

E. Accessories:
1. Ground Level Fill: UL listed, lockable 20-gallon containment with lockable ball valve drain and hand pump to return fuel to tank. Equip with float switch with form "C" contact. Mark in accordance with API RP 1637.
2. Liquid level dial gauge visible from filling unit.
3. Overfill Protection: Automatic shutoff valve set at 90% full capacity.
4. Primary working vents shall extend to 12 feet above grade and be equipped with pressure vacuum cap.
5. Primary And Secondary Emergency Vents: Weighted type, mushroom style, sized per local code.
6. Lifting Lugs: For handling and installation.
7. Lugs for lighting protection/grounding.

2.2 FUEL SYSTEM COMPONENTS

A. Submersible Pump: Red Jacket 1/3 hp single phase with mechanical line leak.

B. Tank Monitor: Veeder Root TLS-300c with a probe for each tank and overfill alarm.

C. Card Reeder: Petrovend K800 Hybrid with FSC 3000 controller and Phoenix software.

2.3 ABOVEGROUND FUEL PIPE AND FIITTINGS

A. Supply and Return Fuel Piping: Piping shall be black steel A-53/A-53M, Schedule 40, Grade B, Type E (Electric Resistance Welded) or Type S (seamless) with welded or threaded joints.

B. Above-ground Vent Lines: Piping shall be galvanized steel A53/A53M, Schedule 40, Grade B, Type E (Electric Resistance Welded) or Type S (seamless) with threaded joints.

C. Fuel Pipe Fittings: Malleable iron threaded fittings, Class 150, ANSI B16.3, standard pattern.

2.4 UNDERGROUND RIGID CONTAINMENT PIPE AND FITTINGS

A. General: Pipe line materials to be furnished and installed under these specifications shall include the necessary pipe along with the fittings, jointing materials, valves, sumps, tools, and

all necessary accessories and appurtenances required for proper completion of this work. Material furnished hereunder shall conform to latest applicable governing standard specifications as hereinafter designated except as modified and supplemented herein. Contractor shall make engineering data and/or drawings complete with detailed submittals for pipe line materials for review and acceptance in accordance with the accepted schedule of Shop Drawing submissions.

B. Comply with UL 971.

C. Supply and Return Fuel Piping and Fittings: Fiberglass nonmetallic underground coaxial piping for petroleum products. Working pressures up to 150 psi and temperature range from -40F to 150F. Pipe shall have an integral epoxy liner. Primary pipe shall conform to ASTM D2310 and ASTM D2995. Interstitial layer shall be uniform thickness with the ability to allow fluid flow throughout meeting UL criteria. This layer shall also prevent relative movement of the primary and secondary pipe walls. Ameron Dualoy 3000/LCX fiberglass pipe and fittings or equal.

1. Manufacturers: Subject to compliance with requirements herein, provide one of the following products:
   a. Ameron International
   b. Rovanco
   c. Smith Fibercast
2. Piping shall be delivered to site in prefabricated spool pieces ready for final field assembly and installation.

2.5 VALVES

A. Comply with UL 842.

B. Manual Fuel Shutoff/Isolation Valves:

1. Exterior or underground piping: Ball Valve full port with stainless steel ball with Teflon seat and padlock provision:
   a. A.Y. McDonald 2032T
   b. Jamesbury Series 100
   c. Or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION OF FUEL STORAGE SYSTEM

A. Installation of storage tank, submersible pumps, dispensers, gauging and monitoring systems, leak detection and alarm systems shall be performed under the supervision of a tank manufacturer’s representative with the warranty of these products signed by an installer certified by the manufacturer.

B. Examination: Contractor shall carefully inspect tank and all fuel system components for defects in manufacture prior to installation. Defective materials shall be corrected before proceeding.

C. Tank Installation:

1. Install in accordance with manufacturer’s installation and operating guidelines.

2. Install all permanent piping and fittings using compatible thread sealant material.
3. All unused tank openings must be properly sealed using threaded pipe plugs, flanges, or caps using compatible thread sealant material.
4. Do not weld on the tank, modify, or penetrate the tank structure in any way without the express written permission of the tank manufacturer.
5. Equipment for handling the tank shall be of adequate size to lift and set the tank. Do not drop or drag the tank.
6. Tanks shall be carefully handled to prevent damage. When using cables or chains, they shall be padded and of adequate length and size.
7. Tank shall be installed in location indicated in the Drawings. Anchor tank to concrete base as recommended by manufacturer.
8. Touch up and repair any damage to the coating that occurs during transportation, installation, or piping installation.
9. The inner tank must be empty before the tank is moved.

3.2 INSTALLATION OF PIPING

A. The piping manufacturer shall provide a field service man on site to properly train the installing personnel in all phases of containment piping installation.

B. Above-ground Piping:
1. Piping and flexible connections to tank and pump shall be provided as required. Pipe joints shall be cut square and taper cleanly to ensure a structurally sound joint. Pipe joints shall be made per manufacturer's instructions.
2. Fuel carrier and containment piping shall be installed with support spacing and support type to meet seismic requirements.
3. Route piping parallel or perpendicular to building lines or as indicated on the drawings.
4. All exposed piping shall be cleaned and painted black with minimum two coats of paint.

C. Underground Piping:
1. The Contractor shall install at least 18 inches below grade at the highest point with a slope of 1/8-inch per foot toward sump or as recommended by manufacturer.
2. The Contractor shall keep open ends of pipe capped or plugged at all times.
3. The Contractor shall install secondary containment pipe with factory furnished split fittings and termination fittings. The Contractor shall install tapped tee fittings for testing and installation of the leak detection system where required.
4. Cutting of Pipe: Cutting of pipe shall be done in a neat and workmanlike manner without damage to the pipe. Unless otherwise recommended by the manufacturer and authorized by the engineer, cutting shall be done with an approved type mechanical cutter.
5. Placing and Laying: Pipe and accessories shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other authorized equipment. Under no

circumstances shall any of the materials be dropped or dumped into the trench. Care shall be taken to avoid abrasion of the pipe. The full length of each section of pipe shall rest solidly upon the pipe bed. Install piping free of sags and bends. Locate groups of pipes parallel to each other. Install fittings for change in direction and branch connections.

6. Pipe that has the grade or joint disturbed after laying shall be taken up and relaid.
7. Pipe shall not be laid in water or when trench conditions are unsuitable for the work. Water shall be kept out of the trench until joining is completed.
8. When work is not in progress, open ends of pipe, fittings, and valves shall be securely closed so that no trench water, earth, or other substance will enter the pipes or fittings.
9. Where any part of the coating or lining is damaged, the repair shall be made by the Contractor at his expense in a satisfactory manner.
10. The piping shall be laid in a bed of sand a minimum of 6 inches thick on all sides of piping exterior. No rocks should be used in first foot of backfill.
11. Place backfill in 8-inch maximum lifts and compact fill to 95% minimum of standard proctor.
12. Stub in underground piping between tanks and fuel island prior to pouring concrete tank pads, pavement, and fuel island

3.3 MONITORING

A. Install Leak Detection and Tank Monitoring and Gauging Systems per manufacturer's recommendation.

B. Overfill protection valve shall be tied into tank monitoring system for audible alarm and be provided with visual alarm installed per plans. An engraved plastic label shall be installed below horn labeled "Fuel Tank Overfill" in 2-inch high letters. The alarm system and label shall be weatherproof and installed within sight of a fuel fill operator to alert the operators of a tank overfill.

C. Provide all power and control wiring for the system and sensors. All wiring shall meet Division 26 requirements.

3.4 TESTING

A. Obtain all testing required by federal, state, and local codes.

B. Tighten and soap all tank fittings before installing tank. Tank shall be tested for a minimum of two hours (or per manufacturer's recommendations) with a pressure of 3 psi maximum to ensure there are no leaks as indicated by soap bubbles or a drop in pressure. An air gauge with one pound increments shall be used so that changes in pressure can easily be observed.

C. The following air pressure testing shall be performed at installation.

D. Install test piping as shown in manufacturer's test booklet. Temporarily plug, cap, or seal off remaining tank openings to hold pressure. If tank is equipped with standard emergency vents, remove emergency vents and cap openings to hold tank pressure as required.

E. The air pressure used for this test must not exceed 5 psig or per manufacturer's recommendation. Use a gauge with a 0 to 15 psig dial span. Set pressure relief valve in test air supply line at 5 psig or as recommended by manufacturer.
   1. Do not leave pressurized tank unattended.
   2. Do not stand in front of tank heads or fittings when pressurizing tank.

F. The inner tank shall be pressurized to a maximum 3 psig air pressure.

G. While maintaining this air pressure, the outer tank shall be tested at a maximum 3 psig in the interstice with air from the primary tank to avoid over-pressurization of the interstice.

H. The inner tank will drop in pressure when the interstitial space is pressurized, but should hold steady at the lower pressure. If test pressure drops below 3 psig, close off the air supply to the annular space. Then reconnect the air supply line to the primary tank and increase the pressure to 3 psig maximum. Then continue testing the annular space per these instructions.

I. All visible seams and welds are to be covered with a leak testing solution or equivalent material for the detection of leaks. Hold test pressure in interstitial space for two hours minimum. A steady drop in gauge pressure, or a stream of bubbles, indicates there may be a leak in the interstitial space.

J. If any leaks are detected, notify the tank manufacturer. If no leaks are found, testing of the tank is complete.

K. **Warning**: To avoid damage to the tank, do not apply air pressure to the interstitial space between the walls of a double-wall tank without air pressure in the primary tank. Do not apply air pressure to the interstitial space that is higher than the air pressure in the primary tank.

L. With tank depressurized, remove test piping, temporary plugs, caps, and seals.

M. Reinstall emergency relief vents, etc. An emergency vent is required on both the primary tank and the interstice.

N. Install all tank accessories per local codes: anti-siphon devices, overfill shut-off, vents, gauges, emergency vents, etc.

O. Manual liquid level gauges may require adjustment before initial start-up and before each refueling of the tank.

P. Adjustments of Liquid Level Gauge:
   1. Visually inspect the moving parts of the gauge through tank top to ensure free full movement. If operation is obstructed, then gauge removal is needed.
   2. Remove gauge from fitting, realign the swing arm and reinstall in fitting in the correct direction allowing for proper operation of the gauge.

Q. Factory-installed equipment and accessories are susceptible to loosening during transit due to vibration. This could result in minor leaks at threaded connections.

R. At the time of site installation and start-up, the installer will be responsible for a visual inspection and repair of loose or leaking connections. (NOTE: Do not attempt to retighten all fittings before a fluid start-up test. Breaking the seal of the sealant during tightening could result in leaks.)

S. To Repair a Loose or Leaking Threaded Connection: Disassemble the connection, clean threads, and reinstall fittings using the proper pipe sealant (ref. Gasola, Blue Block, or Loctite part-pipe sealant and primer).

T. After tank has been filled with fuel, perform a precision "tightness" test using an independent testing service required by federal, state, and local code. The result shall be submitted and labeled as "Certification of Installation of Tank and Piping."

1. The tank test results shall show tightness conforming to EPA regulations (less than 0.1 gallon per hour leakage). Should the tank fail the test, take immediate action to correct any leaks and shall be liable for all charges incident to such correction. Then tank shall be retested until it conforms to the above standard.
2. EPA and/or state-local notification forms shall be completed and submitted to the Resident Engineer.

U. Fuel Pipe Test: After all piping is in place, exposed, and before connections to the tank and equipment, the Contractor shall test with air at 1-½ times the working pressure for 30 minutes without loss of pressure, per manufacturer's recommendations.

V. Secondary Containment Pipe: After all piping is in place and exposed, the Contractor shall test with air at 5 psig for 30 minutes without pressure loss or per manufacturer's recommendation.

W. Final System Test: After pipe connections to tank and equipment have been made, the entire system shall be tested with 5 psig air for 30 minutes without loss of pressure.

X. Test Failure: Any tank, pipe, or equipment that does not pass the tests specified shall be repaired or replaced, by the Contractor, at no additional cost to the Owner. Tests shall be repeated by the Contractor until all items are approved by the Resident Engineer.

3.5 INITIAL FILL

Provide a fuel cost to fill the new tanks with diesel and unleaded gasoline fuel as selected by the Resident Engineer. Coordinate required grade and additives with Resident Engineer and Medical Center Maintenance/Grounds Supervisor.

3.6 TRAINING

Provide four hours of on-site training for Owner's representative in operation and maintenance of tank, piping systems and accessories. Training shall be videotaped.

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